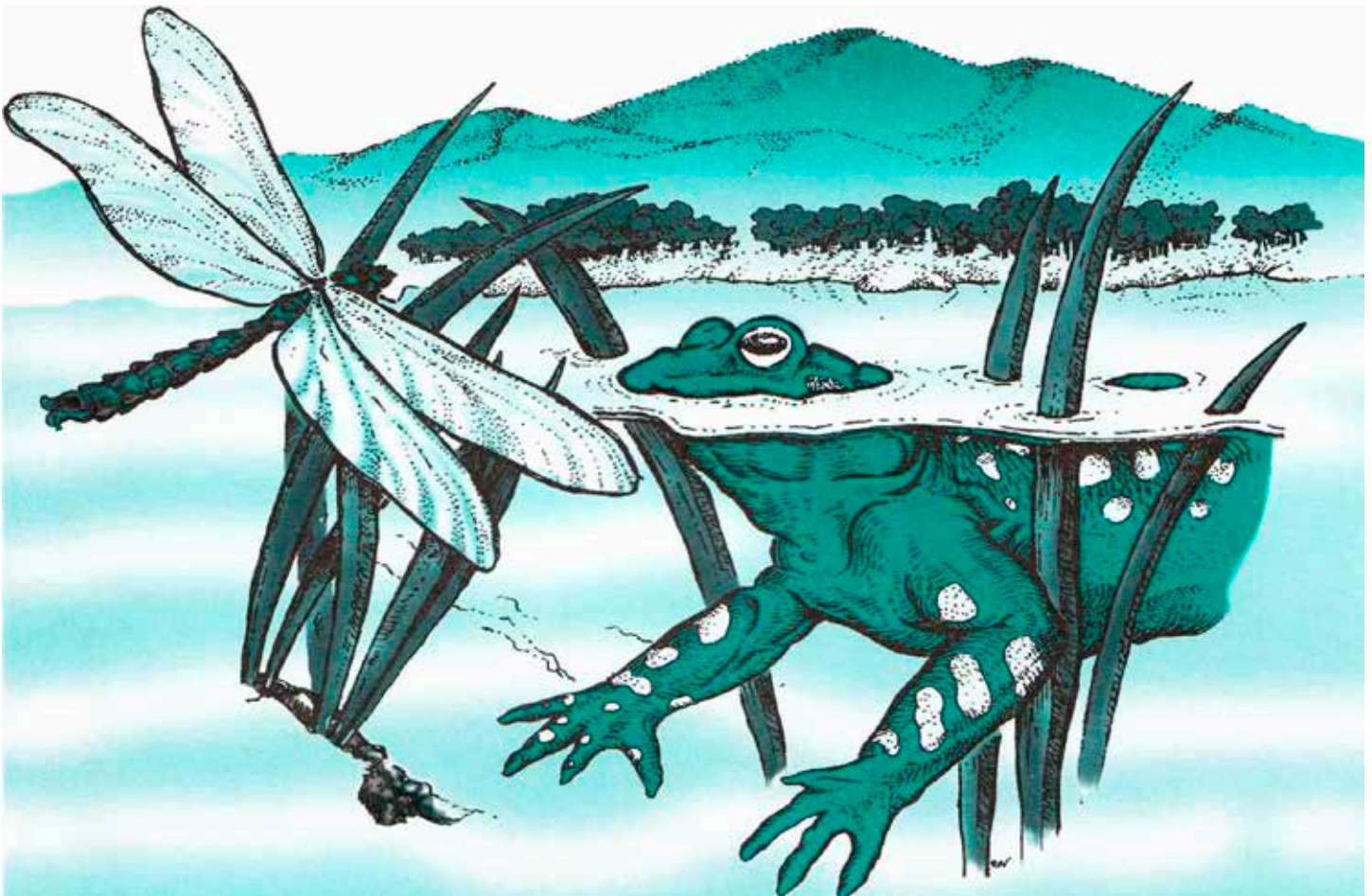


The Rio Grande and Me

El Río Grande y Yo

A Teacher's Guide
to the BioVan



Grade Level : 4-5

ABQ BioPark
903 Tenth St. SW
Albuquerque, NM 87102



What is the BioVan?

The BioVan is an outreach program for the Albuquerque Biological Park, which consists of the Zoo, Botanic Garden, Aquarium and Tingley Beach. The mission of the BioVan is to give students an introduction to the diversity and interdependence of life and to encourage stewardship. The BioVan theme follows the course of the Rio Grande as it starts in the San Juan Mountains of Colorado and empties into the Gulf of Mexico and open ocean of the Atlantic.



Why the BioVan?

The Rio Grande and Me. El Río Grande y Yo. It's our river and it's important to us: to the life it supports here in Albuquerque as we live alongside it, to the Gulf of Mexico nourished by its fresh water and to the oceans of the world to which it connects. Water is a critical natural resource and precious to us, especially in the Southwest Desert. The Rio Grande supports mountain, forest, river and desert ecosystems and all the plant and animal life associated with them in an interdependent web that extends further than we can imagine. In the end, what counts most is that we must be good stewards of the river, our Rio Grande. The ABQ BioPark and the BioVan help this happen.

How does the BioVan work?

The BioVan is staffed by environmental educators, a teaching artist and volunteer BioVan Rangers. It includes live animals, plants, interactive games and a performance stage. Using a variety of teaching strategies, the BioVan combines science with the arts. Other components of the program include a teacher orientation, a BioBox that contains hands-on loan materials and grade-specific Teacher's Guides.



Who supports the BioVan?

The BioVan is funded entirely through the New Mexico BioPark Society (NMBPS). Through their generous support of this program, the NMBPS demonstrates its commitment to conservation education and to the wider community. This support enables the BioVan to visit Albuquerque-area elementary schools free of charge! If you appreciate this effort, please send your comments to BioPark Education, 903 10th St. SW, Albuquerque, NM 87102, and we will pass on your gratitude to the New Mexico BioPark Society.

How to use the Teacher's Guide

BioVan Teacher's Guides are available for grades K - 1, 2 - 3 and 4 - 5. The same key concepts are noted in each Teacher's Guide. These concepts are to help guide the teacher throughout the BioVan learning experience. The grade level concepts do vary and are designed to build upon the previous grade concepts. The grade level concepts are for the students. Suggested resources are listed, including reference books for teachers, books for students use and local agencies that offer additional relevant resources.

Each Teacher's Guide has three lessons: Water as a Natural Resource, The Rio as an Ecosystem and Stewardship. Each of the lessons has two activities: one activity is hands-on and one activity is pencil-and-paper with the worksheet provided. Each lesson is designed to interrelate with the other lessons within that guide and to build upon the same lesson in the other two grade-specific guides.

Key Concepts

for teachers

Adaptation—A modification of an organism or its parts which enables it to survive and reproduce in its environment.

Aquifer—An underground layer of rock, gravel or sand that stores water.

Biodiversity—The variety of plant and animal species in an environment.

Conservation—The conscious use of natural resources in a way that assures their availability to future generations.

Ecosystem—A stable, naturally occurring system of interdependent living and non-living things.

Habitat—The dwelling place of a living thing, chosen for its availability of suitable shelter, space, food and water.

Interdependence—The relationships among living and non-living elements of the environment.

Natural Resource—A portion of the environment that can be drawn upon to care for a need

Pollution—Any substance deposited in air, water or land leading to a condition of impurity, unhealthiness or hazard.

Riparian—Relating to the bank of a waterway such as a river.

Stewardship—The wisdom and respect we demonstrate to all living organisms and the habitats entrusted to our care.

Grade Level Concepts

for students

Fresh Water—Water with insignificant amounts of salt or minerals (0.5 ppt).

Salt Water—Water containing a large amount of salt (34.5 ppt).

Ecological Niche—The role held in a community by a living thing.

Food Web—Interconnected food chains in an ecosystem.

Wildlife Corridor—The connection of protected areas that enables animals to move safely from habitat to habitat as they search for food, shelter and mates.

Resources

BOOKS FOR STUDENTS

Skramstd, Jill. *Wildlife Southwest*

March, Michael. *The Unfolding River*

Holiday, Les. *The Nature Library, Ocean Life*

BOOKS FOR TEACHERS

Javna, John. *50 Simple Things Kids Can Do To Save The Earth*

Maraniss, Linda. *The Gulf of Mexico: A Special Place*

Tweit, Susan. *The Great Southwest Nature Factbook*

Leggett, Mike. *Rio Grande, The People and Politics of One of America's Greatest Rivers*

AGENCIES

City of Albuquerque, Open Space

www.cabq.gov/parksandrecreation/open-space

UNM Biology Department

biology.unm.edu

U.S. Fish and Wildlife Service

www.fws.gov

Bosque del Apache National Wildlife Refuge

www.friendsofthebosque.org

www.fws.gov/refuges/profiles/index.cfm?id=22520

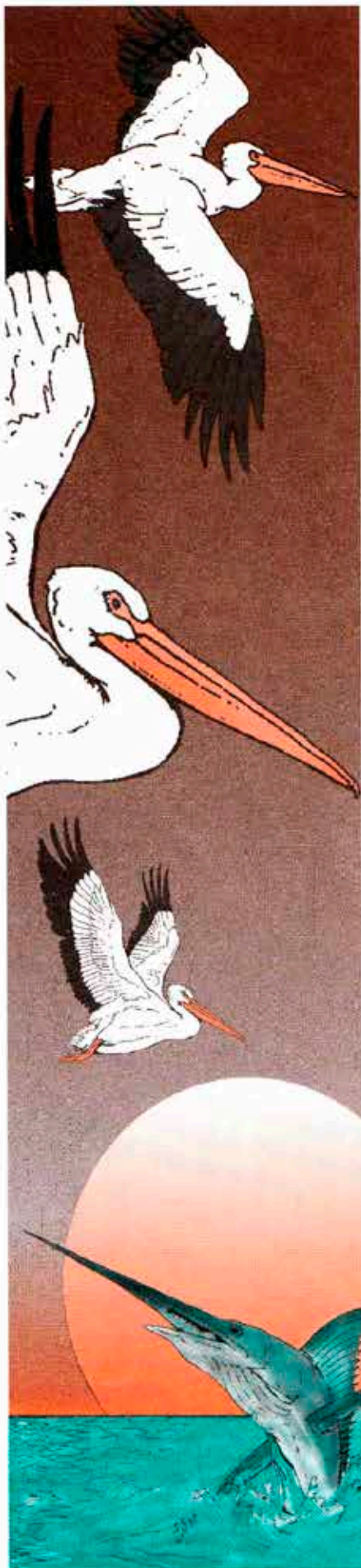
ADDITIONAL RESOURCES

Project WET

projectwet.org

Environmental Education Association of NM

www.eeanm.org



Water as a Natural Resource

Billions of years ago, the Earth was enveloped in clouds so thick and hot that sunlight could not penetrate and moisture could not fall to the surface. As the Earth cooled, rain fell for eons, washing mineral salts from the land masses into the ocean basins - a process that continues today. When water evaporates from fresh or salt water, the heavier salt and mineral content remains behind. That's why rain - even rain falling over the ocean - contains no salt; it's one reason why the ocean always stays salty. The hydrological or water cycle is important in maintaining both salt and fresh water ecosystems. Organisms living in oceans survive partly because the water cycle keeps the saltiness of the water fairly constant. Species that have adapted to terrestrial life survive in part because the water cycle continuously replenishes their sources of fresh water.

Salt of the Earth

Differentiate between fresh water and salt water.

Science: Describe changes of state in matter.

Language Arts: Spell correctly to demonstrate an understanding of spelling patterns.

Introduction: Explain to students that water is cleaned during the water cycle, resulting in fresh water. Precipitation, glaciers, the polar caps, ponds, streams, aquifers and most lakes contain fresh water. This cycle also keeps the oceans at a constant salinity, about 34.5 parts per thousand (about as salty as a cup of water mixed with 3/4 teaspoon of salt).

- Do you think rainwater has any salt in it?
- Does tap water have any salt or minerals in it? (variable trace amounts)
- What's the difference between rainwater, salt water and tap water?



Ocean Survey

Demonstrate our dependence on the salty ocean for food and other products used in daily life.

Social Studies: Cite examples of interconnectedness between the U.S. and the world community.

Language Arts: Use vocal expression to report.

Introduction: The oceans and seas contain 97% of the world's water. This large salt water environment is home to a variety of plants and animals that many people use for food throughout the world. Some products that we use every day have ingredients derived from ocean plants and animals. For example, carrageenan (car a geen an) from seaweed is used as a thickener in some ice cream, pudding and toothpaste. Some fish components are used in medicine.

- Can you think of an ocean food you have eaten?
- Why would the ocean be a food source for many nations?



WORKSHEET

Materials: Salt of the Earth worksheet; saucers (2/ team); 1 cup warm water with 3/4 teaspoon of salt mixed in; 1 cup distilled water.

Procedure: Divide students into teams. Give each team 2 saucers labeled A and B. Pour 2 tablespoons of either distilled or salt water into each saucer without letting students know which saucer has which water. (You keep track of the contents of each team's saucers.) Instruct students to observe and record the results on the worksheet each day. Evaporation may take three days, depending on humidity.

See how many fresh and salt water environments students can find in the word search.

Wrap Up: Talk with students about the results of their experiment. Make sure they understand that when water evaporates, its mineral and salt content remains.



ACTIVITY

Materials: A can of tuna; preparation H; box of pudding mix (ingredients must list carrageenan).

Procedure: Show the students the items. How are the items related? All of the products contain ocean ingredients. Tuna is obvious, but check the ingredients of the pudding and Preparation H to find the ocean connection. Ask students to locate some ocean related items in their homes. Be sure to check the ingredients! Other household products with ocean connections: hand lotion and shampoo may contain kelp extracts (seaweed); pearls are from oysters; the cuttlebone used for pet birds is from a relative of the octopus; lipstick and cosmetics may contain squalene from sharks; cod liver oil from cod. Don't forget to check the toothpaste, ice cream and pudding for carrageenan.

Wrap Up: Have the students report or bring their findings to the class. Were they surprised to find ocean ingredients in so many products? Even though we live many miles from the ocean we still are connected to it on a daily basis by the products that we use.

The Rio Grande and Me

El Río Grande y Yo

Salt of the Earth

Explorer's Name _____

DAY 1

Observations:

SALT WATER
DISH

FRESH WATER
DISH

DAY 2

Observations:

DAY 3

Observations:

Which saucer has the fresh water? Which has the salt water? _____

How can you tell the difference? _____

Water Search

F R I O V R E S E R L J I U
G H T H Y L W X K I N M M I
D L O C D S B Y P V U A A B
N T A O G U L F T E E R O T
T D Y C Y W S R U R T I P Y
Q I E E I G K E T G S N U H
S O F A S E A S H O R E Q S
F G D N C B R H I R B F T K
U J B S A L T W A T E R L B
L A K E Y P J A L U A L G H
P O R A I N G T C A C H R N
T N W L W A V E S O H D L G
H C B N J P I R E F I U Q A

Salt

GULF
OCEAN
SEA
WAVES
SEASHORE
MARINE
SALTWATER
BEACH

Fresh

GLACIER
LAKE
RAIN
FRESHWATER
AQUIFER
STREAM
RIVER
RESERVOIR



The Rio as an Ecosystem

All animals live where they have access to the resources they need. From prehistoric times to the present, people, plants and animals have all coexisted along the Rio Grande. The fifth longest river in North America, the 1,885-mile-long Rio Grande presents an excellent example of a riparian zone, a ribbon of green that travels through the arid southwest landscape. This green corridor helps reduce floods, improve water quality and channel excess water to replenish the aquifer. The Rio is also an environment providing food, shelter and cover for such widely varying species as the raccoon, spadefoot toad, roadrunner and black-chinned hummingbird. Protecting the Rio Grande ecosystem provides us with living examples of the relationships among living and non-living things. As we study these relationships we learn more about the workings of nature and our place in the ecosystem, and why conservation is so important.

Is It Alive?

Distinguish between living and non-living things.

Science: Observe and describe similarities/differences among plants and animals. Observe and classify objects by more than one attribute.

Language Arts: Write to express ideas using pictures and symbols.

Introduction: Lead a discussion with the students about the differences between living and non-living things:

- How are people and animals similar?
- How are people and plants similar?
- How are plants and people different?
- How are rocks and people different or similar?
- Can you name some living things?
- non-living things?



Color It Wild!

Recognize the ways in which living and non-living things interact with each other in the Rio Grande ecosystem.

Science: Investigate and show ways people depend on plants and animals.

Social Studies: Discuss the importance of water to life.

Art: Create an original piece of art and describe it.

Introduction: Introduce the concept that a river is one kind of ecosystem - a place where living and non-living parts interact with each other. For example, the river provides water for plants to grow, which in turn can provide food or shelter for animals. Begin a discussion about interdependence using the questions below:

- How do animals/plants use the river?
- the area close to it?
- How do people use the river, a non-living thing?
- What parts of the river can animals/plants use?



ACTIVITY

Materials: Paper; pencils, crayons.

Procedure: Have the students fold a sheet of paper in half. Tell them to draw a happy face (living) at the top of the paper in one column and a rock (non-living) in the other. Have the students bring these charts on a nature walk. Find a spot outside where the students can stop and observe the environment. For each living or non-living thing they find, have them draw a symbol of what they find in the appropriate column. Remind them that they are guests visiting a habitat and they should not pick up or remove a living or non-living thing from the place where it was found.

Wrap Up: When you return to the classroom, discuss their findings.

- Were there any living things that looked non-living?
- Did you see any living things using non-living things?

Remind the students that as people we differ from other living things because we can purposely change the things we find in our environment to fit our needs. But, we must realize that the changes we make can affect the future of other living and non-living things.



WORKSHEET

Materials: *Color It Wild!* worksheet; pencils; crayons.

Procedure: Have students complete the worksheet. Use the picture on the worksheet to help them understand that a river is home to many kinds of plants and animals. Allow them time to discuss the many ways people might use the river, too.

Wrap Up: Find out how much the students understand about the Rio Grande.

- What might happen to plants/animals if there were no water in the riverbed? too much?
- What might happen to animals if there were no plants?
- What might happen to plants if there were no animals?

Make a river mural. Let the students draw, color in and label the living and non-living things found in a river's ecosystem.

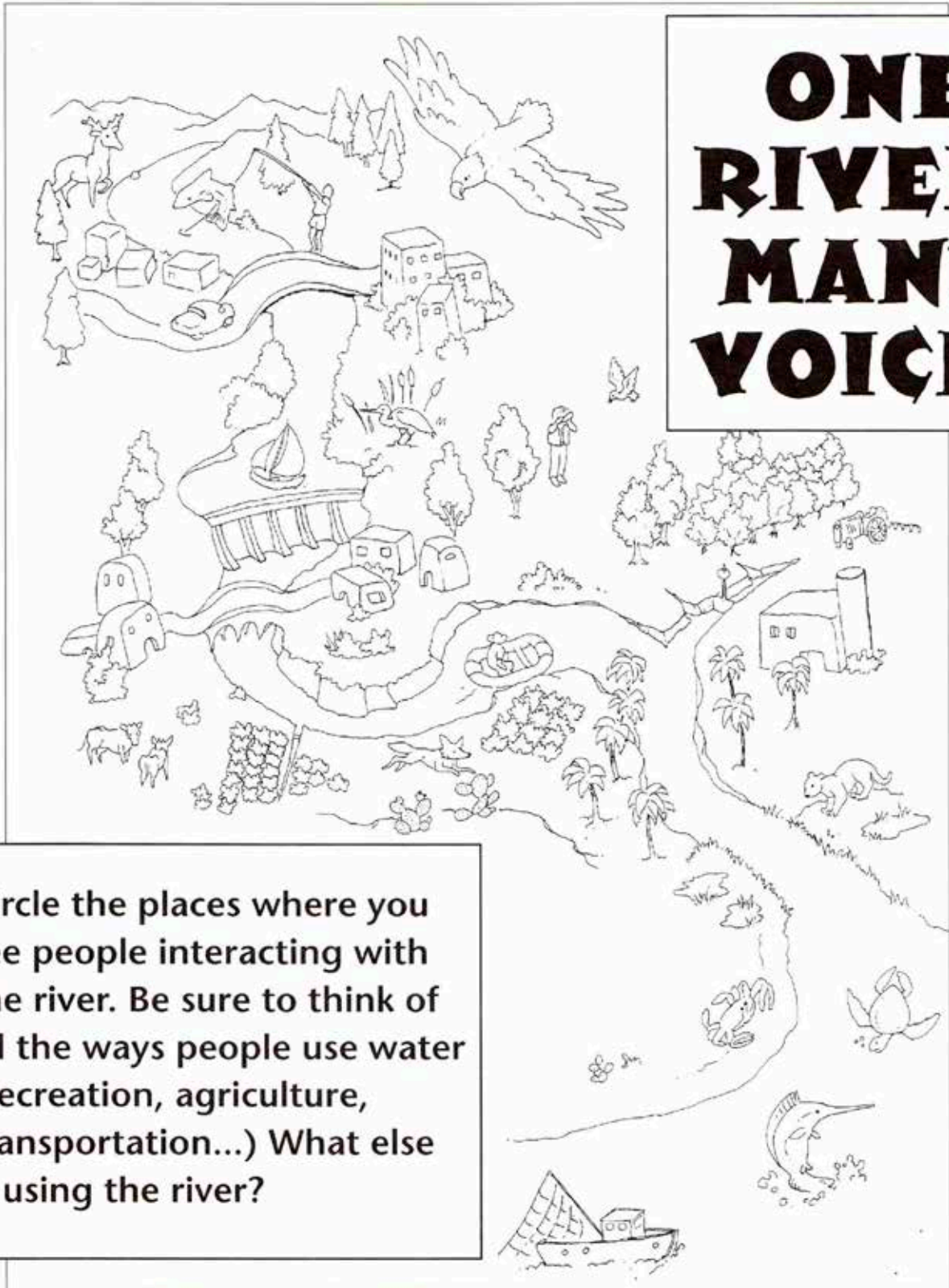
The Rio Grande and Me

El Río Grande y Yo

Explorer's Name _____

ONE RIVER, MANY VOICES

Circle the places where you see people interacting with the river. Be sure to think of all the ways people use water (recreation, agriculture, transportation...) What else is using the river?





Stewardship

Rivers are among the most important geographical features of the planet. Everywhere rivers are found, there are many different kinds of living organisms using them, especially humans. Humans living along the Rio Grande have changed it in many ways, by building dams and ditches along its course; by emptying chemicals and waste materials into it; by allowing cattle to trample its banks. Wetlands and young bosques of the Rio Grande have nearly disappeared. Testing the quality of the Rio's water regularly is one way to figure out what we need to do to keep the river healthy. Many people who work for government and civic organizations, along with concerned citizens, care about the Rio and work hard to maintain and reestablish the many kinds of plants and animals threatened by polluted water. The best cure for pollution, however, is learning how to avoid creating it.

River Rangers

Observe ways we can protect the Rio Grande.

Science: Identify choices people have in the care of the environment and the consequences of those choices.

Social Studies: Begin to identify ways to protect water, air and land.

Introduction: With an increasing human population along areas of the Rio Grande, the opportunity for problems on the river also increases. By observing the river ecosystem people will be better able to protect it.

- Have you ever seen the Rio Grande?
- What did it look like?
- Did you see things that didn't belong there, either in the river or along its banks?
- What can we do to help the Rio Grande?

By recycling, conserving water and controlling pollution we can keep the river healthy for all living things.



WORKSHEET

Materials: *River Rangers* worksheet; pencils or crayons.

Procedure: Have the student complete the worksheet by choosing the best activities for the river.

Wrap Up: Have students discuss their choices.

- Why is it important not to waste water?
- How does recycling help the river?
- What can students do to protect the river?

Be a River Ranger and remind people to take care of the river and keep it clean.



Safe to Drink?

Identify visible and invisible factors that may affect water quality.

Science: Observe and describe states of water and changes in them.

Health and Wellness: Identify safety hazards in the environment.

Introduction: Pollution is caused by the introduction of any substance (natural or synthetic) that leads to an unhealthy or hazardous condition. Some forms of water pollution are not easily seen. People use a variety of tests to determine the quality of water. Ask students what they think pollution is.

- Where have you seen pollution?
- What kinds of things could pollute the Rio?
- Why do you think people should work hard to keep water in the Rio clean?



ACTIVITY

Materials: A large empty jar; a small jar filled with river or ditch water; a small jar filled with water from the school water fountain; a small jar filled with muddy water (mix before class); coffee filter.

Procedure: Label the three jars of water. Show the jars to the students. Ask: Which water might you drink? Why? If the only water to wash your clothes in was this (show them a muddy sample), what would you do? Demonstrate how people get clean water into their homes by using a filter. Place the filter over the large jar and slowly pour the muddy water through it. Would this water be safe to drink?

Wrap Up: Help children realize that preventive measures are the best way to keep water clean.

- Does the filter keep all the pollution away?
- What are the other ways we can keep water clean?
- What is the best way to protect living things from pollution?

Remind the students that even though the sample looks clean, some things can't be seen with your eyes. Water quality experts use special materials to discover whether water really is safe to drink.

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El Río Grande y Yo

Explorer's Name _____

SAFE SPOTS

DO I WANT A WILDLIFE CORRIDOR?

DEVELOPER



FARMER



ENVIRONMENTALIST



BIRD WATCHER



**AN ADULT THAT
I KNOW**



ME!



CATTLE RANCHER



ANIMAL